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PATENT, TRADEMARK  
AND COPYRIGHT CAUSES

September 5, 1997

Commissioner of Patents and Trademarks  
Washington, D. C. 20231

Attorney File 1339.08.A

Sir:

Transmitted herewith for filing is the patent application of R. David Lewis et al. for "Backframe for Self Contained Breathing Apparatus".

The application has a total of 7 claims, with 1 independent claim. The applicant is entitled to the benefit of small entity status, so the filing fee is \$385.00.

The application is complete, with 2 sheets of drawings. 2 declarations in support of Small Entity Status, and a check in the amount of \$385.00 to cover the application filing fee. Any additional fees may be charged to Deposit Account No. 13-3160.

An assignment is also enclosed for recording. The assignment includes a cover sheet and a check in the amount of \$40.00 as the recording fee.

Respectfully submitted,

James B. Middleton

JBM/e

Enclosure

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# **BACKFRAME FOR SELF CONTAINED BREATHING APPARATUS**

## **BACKGROUND OF THE INVENTION**

### Field of the Invention

This invention relates generally to self contained breathing apparatus, and is more particularly concerned with a backframe comprising a generally rigid member including an enclosed space for housing components, the rigid member being shaped for comfort of the user and for receiving the air tank.

### Discussion of the Prior Art

Current self contained breathing apparatus (SCBA) have four major assemblies including a compressed air cylinder, pneumatics to conduct and control air flow from the cylinder to the face, a facemask, and a backframe system. The backframe holds the air cylinder on the user's back, and is frequently used to mount the pneumatics and other items. The prior art backframes are either tubular style or plate style. Tubular style frame are made up of metal tubing to provide a lightweight yet strong platform to hold the cylinder. Plate style backframes are made of either metal or plastic sheet formed into a shape that generally conforms to the user's back.

Both of the prior art backframe styles have the disadvantage of leaving items mounted on them exposed to environmental hazards. The worst environmental conditions are generally acknowledged to be those associated with fire fighting wherein the apparatus is exposed to extreme temperatures, radiation energy, chemicals, water, debris, and physical impact.

However, other SCBA uses also place such equipment in hazardous environments of various types.

Thus, the prior art has not provided a backframe that both facilitates mounting of all necessary equipment and protects that equipment from the hazards of the environment.

## SUMMARY OF THE INVENTION

The present invention provides a backframe for a self contained breathing apparatus wherein the backframe is similar to a plate style backframe, but the device of the present invention defines an enclosure. The front of the enclosure is shaped generally to conform to the user's back, and the rear is shaped to receive an air tank. The front and rear are separate members that are fixed together, yielding a strong device with optimal strength-to-weight ratio. Between the front and rear, the device defines a protective housing for batteries, electronic components, "buddy" air hose and the like.

In a preferred form of the invention, there is a low air signal that provides an auditory signal, and may also provide a tactile signal so the signal can be detected even in very noisy environments.

## BRIEF DESCRIPTION OF THE DRAWINGS

These and other features and advantages of the present invention will become apparent from consideration of the following specification when taken in conjunction with the accompanying drawings in which:

Fig. 1 is an exploded perspective view showing a backframe made in accordance with the present invention, and including an air tank to be used with the device;

Fig. 2 is a rear elevational view of the device shown in Fig. 1 with the air tank omitted; and,

Fig. 3 is a front elevational view of the device in Fig. 2 with the closure plate omitted to show the internal construction of the backframe.

#### DETAILED DESCRIPTION OF THE EMBODIMENT

Referring now more particularly to the drawings, and to that embodiment of the invention here presented by way of illustration, the device in Fig. 1 includes a shell generally designated at 10, the shell 10 having some depth to receive various components as will be discussed below. The shell 10 is then closed by a closure plate 11. The closure plate 11 is shaped to be comfortably received on the back of the user, and includes a removable compartment cover 12. It can be seen that the compartment cover 12 allows access to the interior of the backframe without removing the entire closure plate 11, and may allow access to a battery compartment 14 or the like. Those skilled in the art will realize that such a compartment cover may be provided for any component that needs to be reached easily. It will also be understood that the closure plate 11, as well as the compartment cover 12 constitutes a substantially water- and contamination-resistant enclosure.

Though the closure plate 11 is relatively flat, the plate is shaped to conform to the human anatomy for maximum comfort for the user of the self contained breathing apparatus (SCBA). The shell 10, on the other hand, includes a rear wall 15 that is generally parallel to the closure plate 11, and is held apart from the closure plate by side walls 16. Thus, the shell 10 has considerable depth for housing a variety of components. It will be recognized by those skilled

in the art that many different components may be provided for in the shell, but the shell here shown includes spaces 14 for a battery compartment, a space 18 for a low air alarm, and a space 19 for a "buddy" air hose.

Considering Figs. 1, 2 and 3 of the drawings, it will be noticed that the outside of the shell 10 (Fig. 2) has a relatively flat area down the middle to receive the air tank 20, which will be secured to the backframe in the conventional way. Those skilled in the art will understand the connection, and no further description is required.

In the upper area of the shell 10 is the space 18 for the low air alarm. Fig. 2 shows the outside of this area, and illustrates the sound holes 21 to promote propagation of the sound from within the enclosure. Referring to Fig. 3 also it can be seen that the alarm area is covered by a cover 22, the cover 22 being partially broken away to show the particular alarm device.

It is known in the art to provide a low air pressure alarm. One of the most common alarms is a whistle, which can be provided using only fluid pressure and controls. The alarm here shown comprises a bell, or gong, 24 activated by a striker unit 25. It is contemplated that the backframe will include batteries, so the striker unit 25 could be electric; however, electrical power can be conserved by having the actual operation by fluid pressure. If desired, the striker unit may be electrically triggered, though fluidic control is also reasonable.

One advantage of the alarm here shown is that, when the alarm is activated, there will necessarily be a physical vibration resulting from the striking of the bell 24. Since the bell 24 is attached to the backframe, and the backframe is attached to the user, the vibration will be transmitted to the user. This results in an alarm that provides both an auditory and a tactile

sensation so the alarm will not be overlooked by the user. Also the bell sound may be *minimized through use of a non-ringing gong*, so that the alarm becomes primarily tactile. Other known tactile devices may be substituted if desired.

Below the space 18 for the alarm is the space, or compartment, 14 for the batteries. As is best shown in Figs. 1 and 3, the battery compartment 14 includes its own walls 26 that, with the cover 12, define a completely closed compartment. Those skilled in the art will understand that batteries must be totally isolated both to prevent damage to the batteries by a hazardous environment, and to prevent damage to other components by the chemicals from batteries, especially old batteries that have a tendency to leak. As is shown in Fig. 1 of the drawings, the cover for the battery compartment may be accessible from outside the closure plate 11 since batteries must be changed frequently.

In Fig. 2 of the drawings the buddy breathing connection is shown. The buddy breathing connection includes a connector 28 having a handle 20 that is easy to grasp. It is contemplated that the connection 28 will include both male and female connectors so any user can connect to any other user. Thus, a person who is low on air can simply grasp the handle 29 from a buddy's apparatus, take the similar handle from his own apparatus, and connect the two together to receive a supply of air.

Looking at Fig. 3 of the drawings, it can be seen that the hose 30 is connected to the connection 28 and extends into the shell 10. The hose 30 extends all the way to one end of the shell 10, makes a return bend and continues to the opposite end of the shell. As a result, the hose has free length equal to two lengths of the backframe, and this length of hose can be

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pulled from the backframe. In one embodiment of the invention the free length of the hose is about 2 feet, though this may vary considerably depending on the particular design of the backframe system. Considering the 2 feet by way of example, however, it will be understood that a person with low air can pull the 2 feet of hose from the supplier's backframe, and can pull 2 feet from his own backframe, giving a total hose length of about 4 feet. Such a length provides a sufficient distance between the two that they can leave the hazardous environment without the additional hazard of a short tether between them.

The present invention therefore provides a backframe for an SCBA wherein the backframe is made up of a shell having noticeable depth, and a closure plate fixed to the shell and closing the interior of the shell. The combination of the shell and the closure plate yields a backframe that is strong, yet light in weight. Various components are housed within the shell and are protected from the environment by the closed backframe. As here disclosed, the components include a low air pressure alarm, a battery compartment, and a buddy air hose, but those skilled in the art will realize that numerous other components may be housed within the backframe as desired.

It will therefore be understood by those skilled in the art that the particular embodiment of the invention here presented is by way of illustration only and is meant to be in no way restrictive; therefore, numerous changes and modifications may be made, and the full use of equivalents resorted to, without departing from the spirit or scope of the invention as outlined in the appended claims

WHAT IS CLAIMED AS INVENTION IS:

1. A backframe, for a self contained breathing apparatus, said self contained breathing apparatus including an air tank, and control components for controlling the flow of air from said air tank, said backframe comprising a shell including a rear wall adapted to receive said air tank thereagainst, side walls fixed to said rear wall and extending forwardly of said rear wall, and a closure plate receivable by said side walls for enclosing said shell to provide a water- and contamination-resistant enclosure, said control components of said self contained breathing apparatus being contained within said enclosure.

2. A backframe as claimed in claim 1, and further including a buddy breathing hose, said buddy breathing hose including a connector positioned exteriorly of said shell and a flexible hose extending into said shell, said flexible hose being extendible from said shell for allowing freedom of movement of said connector with respect to said backframe.

3. A backframe as claimed in claim 2, wherein said connector further includes both male and female connectors.

4. A backframe as claimed in claim 1, wherein said control components include a low air pressure alarm, said shell includes a space for receiving said low air pressure alarm and defines openings for propagation of sound from said alarm, and further including means for providing a tactile signal from said alarm.

5. A backframe as claimed in claim 1, wherein said control components include battery means for supplying electric power to said self contained breathing apparatus, said shell



including a compartment for said battery means, said compartment including walls for defining said compartment, and a compartment cover plate for closing said compartment.

6. A backframe as claimed in claim 5, said closure plate defining an opening therein, said opening being closed by said compartment cover for allowing access to said compartment without removing said closure plate.

7. A backframe as claimed in claim 1, and further including a buddy breathing hose, said buddy breathing hose including a connector positioned exteriorly of said shell and a flexible hose extending into said shell, said control components further including a low air pressure alarm, said shell including a space for receiving said low air pressure alarm and defining openings for propagation of sound from said alarm, and further including means for providing a tactile signal from said alarm, said control components including battery means for supplying electric power to said self contained breathing apparatus, said shell including a compartment for said battery means, said compartment including walls for defining said compartment, and a compartment cover plate for closing said compartment.

## ABSTRACT OF THE DISCLOSURE

A backframe for a self contained breathing apparatus (SCBA) is formed of a molded shell having some depth, and a closure plate fixed to the shell to provide an enclosed volume. The molded shell with the closure plate yields a good weight-to-strength ratio, and provides a water- and dust-resistant enclosure for control components of the SCBA. A water-tight battery compartment is enclosed within the shell so the batteries are separated from other components. A low air pressure alarm provides an auditory signal, and may also include a tactile signal. A buddy breathing hose can be pulled from the backframe to provide a reasonable length tether; and, by connecting two such buddy breathing hoses, twice the length is provided.

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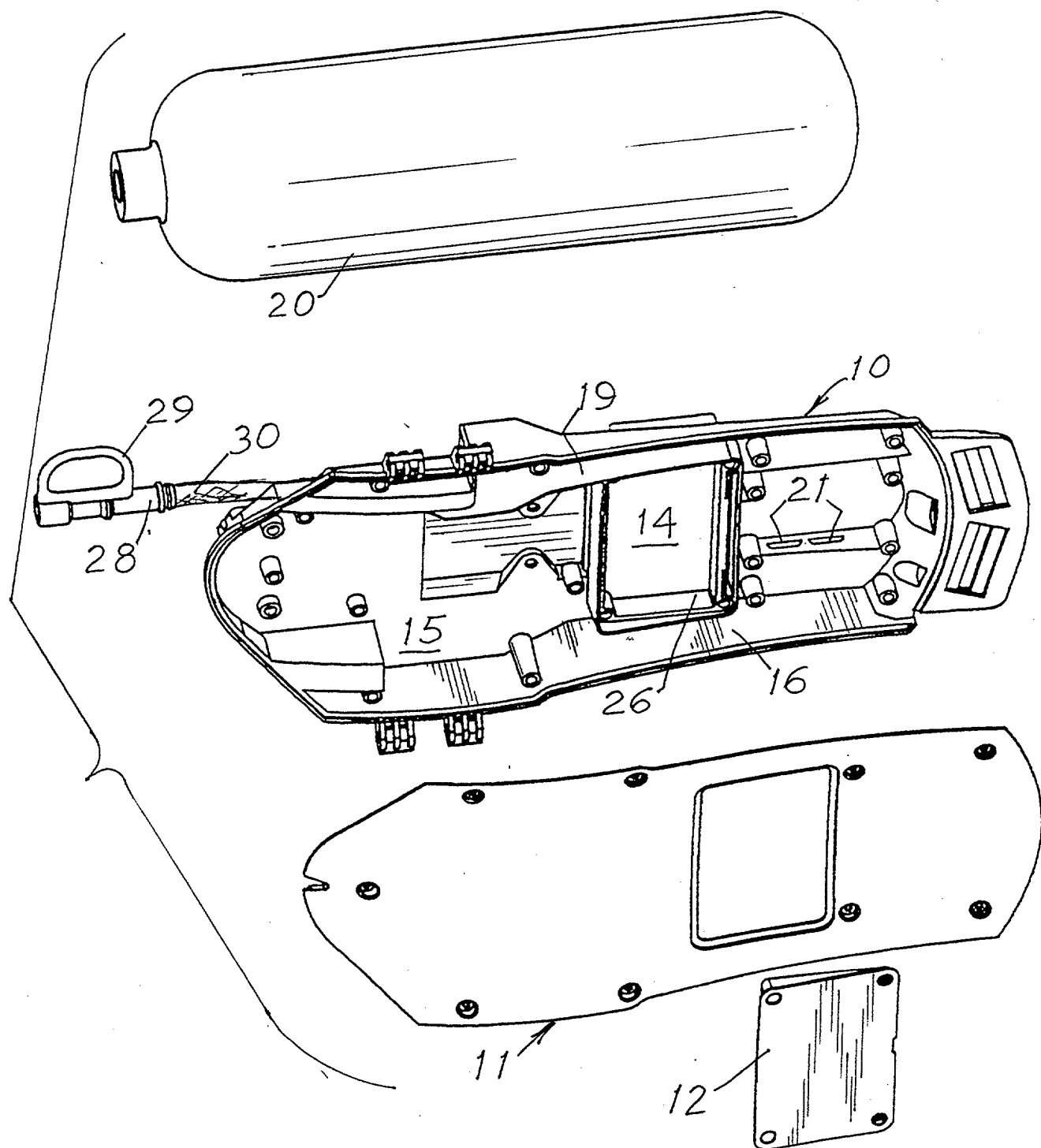


FIG. 1

FIG. 2

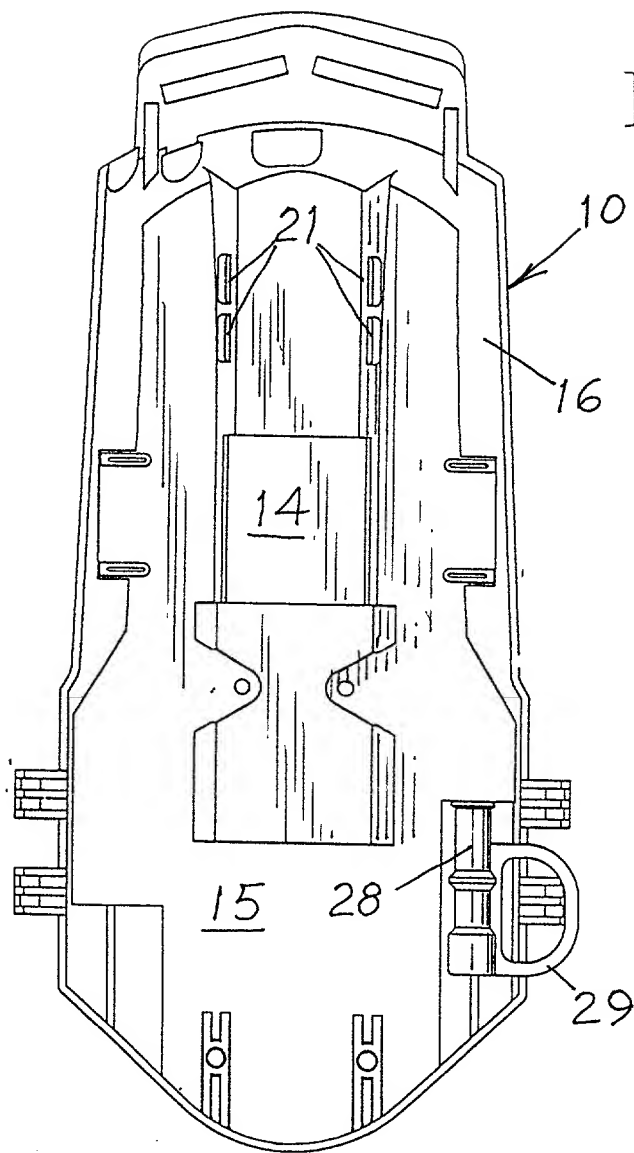
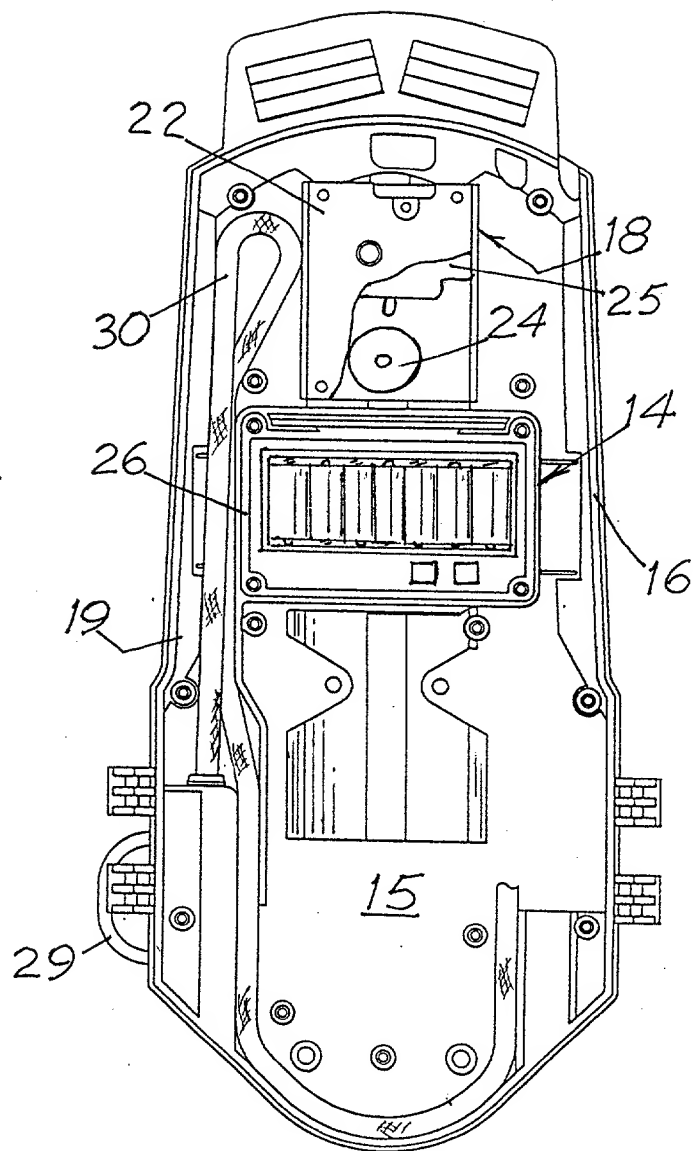


FIG. 3



**DECLARATION OF JOINT INVENTORS CLAIMING SMALL ENTITY STATUS**

As a below named inventors, we hereby declare that we qualify as joint inventors as defined in 37 CFR 1.9(c) for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States code, to the Patent and Trademark Office with regard to the invention entitled "**Backframe for Self Contained Breathing Apparatus**" described in the attached specification.

We have not assigned, granted, conveyed or licensed, and are under no obligation under contract or law to assign, grant, convey or license any rights in the invention to any person who could not be classified as an independent inventor under 37 CFR 1.9(c) if that person had made the invention, or to any concern which would not qualify as a small business under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).


Each person, concern or organization to which we have assigned, granted, conveyed or licensed or are under an obligation under contract or law to assign, grant, convey or license any rights in the invention is listed below:

International Safety Instruments, Inc.  
922 Hurricane Shoals Road  
Lawrenceville, GA 30243-4824  
(a small business concern)

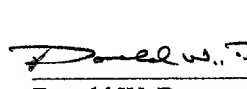
We hereby acknowledge the duty to file, in this application for patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. [37 CFR 1028(b)].

We hereby declare that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

**SIGNATURES OF INVENTORS:**

  
R. David Lewis

  
Robert E. Gray

  
Donald W. Dawson

  
Paul D. Hiltman

Sep 2, 1997  
Date

Aug 29, 1997  
Date

August 2, 1997  
Date

8-29-97  
Date

Attorney File: 1339.08.A

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**DECLARATION OF SMALL BUSINESS CONCERN CLAIMING SMALL ENTITY STATUS**

I hereby declare that I am an official of the small business concern identified below, and am empowered to act on behalf of the said small business:

International Safety Instruments, Inc.  
922 Hurricane Shoals Road  
Lawrenceville, GA 30243-4824

I hereby declare that the above identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under Section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties control or have the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention "**Backframe for Self Contained Breathing Apparatus**" by the inventors, R. David Lewis, Robert E. Gray, Donald W. Dawson and Paul d. Hiltman, described in the specification filed herewith.

If the rights held by the above identified small business concern are not exclusive, each individual, concern or organization having rights to the invention is listed below and no rights to the invention are held by any other person, other than the inventor, who could not qualify as a small business concern under 37 CFR 1.9(d) or by any concern which would not qualify as a small business concern under 37 CFR 1.9(d) or a nonprofit organization under 37 CFR 1.9(e).

NONE

I acknowledge the duty to file, in this application for patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. [37 CFR 1.28(b)].

**I hereby declare** that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

  
Paul D. Hiltman

Date 8-29-97

Attorney File 1339.08.A

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# DECLARATION, POWER OF ATTORNEY, AND PETITION

As below-named inventors, we hereby declare that:

Our residence, post office address and citizenships are as stated below next to our names;

We verily believe ourselves to be the original, first, and joint inventors of the invention titled "**Backframe for Self Contained Breathing Apparatus**" which is disclosed and claimed in the attached specification;

We have read and understood the contents of the specification, including the claims, in the application, attached hereto, as amended by any amendment specifically referred to in this declaration;

We do not know and do not believe that the invention was ever known or used in the United States before our invention thereof, or patented or described in any printed publication in any country before our invention thereof, or more than one year prior to said application; or in public use or on sale in the United States more than one year prior to said application;

We acknowledge our duty to disclose information we are aware of which is material to the examination of the said application in accordance with Section 1.56(a);

the invention has not been patented or made the subject of an inventor's certificate issued before the date of said application in any country foreign to the United States on an application filed by us or our legal representatives or assigns more that twelve months prior to said application; and, as to applications for patents or inventor's certificate on the invention filed in any country foreign to the United States of America, prior to said application by us or our legal representatives or assigns

  X   no such applications have been filed, or

       such applications have been filed as follows:

Country	Appln no.	Filing Date	Issue Date	Priority Claimed
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**Power of Attorney:** As named inventors, we hereby appoint the following attorney to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

JAMES B. MIDDLETON Reg. No. 26,484

P. O. Box 1968

Decatur, Georgia 30031-1968

Telephone: 404-377-5327

Facsimile: 404-377-5321

Wherefore we pray that Letters Patent be granted to us for the invention or discovery described and claimed in the above identified application, and we hereby subscribe our names to said application as amended, and to this declaration, power of attorney, and petition.

Name of Inventor: R. David Lewis	Robert E. Gray	Donald W. Dawson	Paul D. Hiltman
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Residence: U.S.A.	U.S.A.	U.S.A.	U.S.A.
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Citizenship: U.S.A.	U.S.A.	U.S.A.	U.S.A.
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2450 Grande Oak Circle  
Lawrenceville, GA 30043

1158 Mason Woods Dr.  
Atlanta, GA 30329

We declare further that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Signature of Inventor

Signature of Inventor

Signature of Inventor

Signature of Inventor

*Donald W. Dawson*

*Robert E. Gray*

*R. David Lewis*

*Paul D. Hiltman*

Date August 2, 1997

Date Aug 24, 1997

Date Sept 2, 1997

Date 8-29-97

Attorney File: 1339.08.A